



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
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APR 07 2015

Ms. Patricia Wise, Manager
Monitoring & Assessment Section (MC-234)
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Dear Ms. Wise:

In preparation for the next triennial revision to the *Texas Surface Water Quality Standards*, we have reviewed recommendations made during previous revision processes and other sources of information. Enclosed are our suggestions for the upcoming revision.

Please note that the positions described in our enclosed comments are preliminary in nature and do not constitute a disapproval or determination by the Environmental Protection Agency (EPA) under §303(c) of the Clean Water Act. Approval and disapproval decisions will be made by the Region, following adoption of new or revised standards by the state and submittal to the EPA. Any determination pursuant to Clean Water Act §304(c)(4)(B) may only be made by the EPA Administrator.

We look forward to continuing work with you and your staff on the protection of water resources. If you have any questions, please contact me at (214) 665-6644 or have your staff contact Diane Evans at (214) 665-6677.

Sincerely,

A handwritten signature in black ink, which appears to read "Philip A. Crocker", is positioned above the printed name.

Philip A. Crocker
Chief

Watershed Management Section (6WQ-EW)

Enclosures

cc: Debbie Miller, TCEQ – Standards Group (MC-234)

EPA recommendations for 2017 revision of *Texas Surface Water Quality Standards*

§307.2. Description of Standards

1. §307.2(f). Compliance schedules. EPA recommends adding language to the compliance schedule provision which requires milestones and dates to measure progress toward final project completion. The provisions in the Louisiana water quality standards (WQS) and the New Mexico WQS each include such language and may be useful examples.
2. §307.2(g). Temporary standards. In September 2013, EPA published proposed revisions to the federal WQS regulation at 40 CFR Part 131. The proposed rule included clarifications for six key program areas, one of which is variances to WQS. The provision for temporary standards in §307.2(g) of the Texas WQS is generally consistent with EPA's definition of WQS variances, as used in national guidance and other documents.

The Texas WQS also include a provision for temporary variances at §307.2(d)(5), which has been used when TCEQ or a regulated facility is undertaking a study to determine whether the presumed aquatic life use or if the statewide aquatic life criteria for a metal is appropriate in a particular water body. In both of these cases, there is an established methodology to conduct the study.

A temporary standard under §307.2(g) of the Texas WQS may be adopted when the current criterion "cannot be attained for one or more of the reasons listed under §131.10(g) of the federal standards regulation." Factor 6 of §131.10(g) is applicable to economic considerations of costs needed to meet WQS, which stakeholders have raised as a concern in the workgroup meetings to address thermal discharges. Economic factors are often discussed at the national level for implementation of nutrient criteria in wastewater permits.

Although no standards under §307.2(g) have been adopted to date, EPA believes that use of the temporary standards provision would be more appropriate, than the temporary variance process at §307.2(d)(5), for flexibility in implementing temperature criteria and nutrient criteria in the permitting program. Since both the numeric temperature criteria in Appendix A of the Texas standards and the chlorophyll a criteria in Appendix F were developed as site-specific criteria, it would be difficult to justify why these criteria are not appropriate for a particular water body, which is the basis for allowing a temporary variance under the Texas WQS.

EPA may issue a revised WQS regulation in 2015. We recommend that TCEQ review any new provisions for variances in the federal regulation, for appropriate changes to the temporary standards provision in the Texas WQS.

§307.3. Definitions and Abbreviations.

3. §307.3(a)(16). Critical low-flow. EPA recommends the state use 7Q10 as the critical flow for implementation of chronic criteria to protect aquatic life and the 1Q10 flow for implementation of acute aquatic life criteria.¹ EPA's *Water Quality Standards Handbook* also includes suggested biologically-based flow rates for implementation of aquatic life criteria (4B3 flow – chronic criteria and 1B3 – acute criteria).

¹ U.S. EPA. 2014. *Water Quality Standards Handbook*. Office of Water. Available at (please see Chapter 5.2): <http://water.epa.gov/scitech/swguidance/standards/handbook/index.cfm>

4. §307.3(a)(49). Primary contact recreation. EPA recommends that TCEQ review completed recreational use attainability analyses (UAAs) to determine if modifying this definition to include all kayaking, canoeing and rafting activities would be appropriate, rather than the current limitation of whitewater conditions. During the stakeholder process for the 2010 triennial revision, it was noted that kayaking, canoeing and rafting activities under normal flow conditions, may result in more water contact than occurs while motor boating.
5. §307.3(a)(80). Toxicity. Effects of dissolved salts on aquatic life are excluded from the definition in the standards, if present in source waters. EPA recommends adding language which states that effluent with high total dissolved solids (TDS) concentrations/ionic strength from its source water cannot automatically qualify to be discharged to a water body with low TDS concentrations/ionic strength. Implementation of this provision may be appropriate if both the source water and the receiving water were the same or very similar concentration of ions and proportions of those ions, but not where the concentrations in the receiving water are significantly lower than the source water.

EPA also recommends that a definition for “osmotic imbalance” be added to address excessive levels of specific ions or changes in the natural ratios of ionic components. Such imbalance and excessive concentrations resulting in stress (which may cause lethal and/or sub-lethal effects to aquatic organisms) is a particular concern in the case of brine discharges.
6. §307.3(a)(82). Wetland water quality functions. EPA recommends modifying this definition to read “...habitat for aquatic life and wildlife.” Another option is to add the phrase “terrestrial life,” which is used in other sections of the Texas WQS.
7. Definitions for terms such as “bioaccumulation factor” and “relative source contribution,” and the acronyms, may be appropriate depending on how the human health criteria in §307.6 are revised.

§307.4. General Criteria

8. §307.4(b)(5). EPA recommends the development of numeric standards, or detailed implementation provisions, to limit changes in turbidity or color.
9. §307.4(e). Nutrients. EPA recognizes the significant effort put forth by TCEQ leading to the adoption of chlorophyll-a criteria for reservoirs in the 2010 Texas WQS. We encourage TCEQ efforts toward development and adoption of numeric criteria for nitrogen and phosphorus for lakes and reservoirs, as well as for the other classes of water in the state. EPA considers state adoption of numeric criteria for nitrogen and phosphorus, the causal parameters directly responsible for eutrophication in near-field and/or downstream waters, a priority. We also recommend the development of procedures to translate narrative nutrient criteria into water quality-based effluent limitations and for listing of water bodies with impairments of the narrative nutrient criterion under Clean Water Act (CWA) §303(d).
10. In 2014, EPA released guidance on developing narrative provisions in water quality standards to address protection of uses in downstream waters.² Adoption of a narrative provision for downstream protection in the 2017 revision of the Texas WQS, could enhance the implementation of narrative nutrient criteria in the assessment and permitting programs, particularly for waters where development of numeric criteria is a longer-term process. We also note that this type of provision would complement the existing processes in TCEQ’s Implementation Procedures such as the

² U.S. EPA. 2014. *Templates for Narrative Downstream Protection Criteria in State Water Quality Standards*. Available at: <http://water.epa.gov/scitech/swguidance/standards/narrative.cfm>

additional screening steps conducted if a higher aquatic life use or public water supply is within three miles downstream of a permitted discharge. In addition to the template for narrative provisions, EPA also released a “decision tool” for protection of downstream waters, which was developed at the request of (and coordination with) several states.³

§307.5. Antidegradation

11. EPA proposed revisions to the federal WQS regulation also include implementation of antidegradation polices as a key program area. The proposed rule discusses options which would facilitate maintenance and protection of high quality waters, including the development of methods to conduct “alternatives analyses,” prior to allowing degradation. Depending on the timing of EPA’s process and TCEQ’s WQS revision, revisions to §307.5 may be required. Regardless of the timing, EPA recommends that TCEQ develop processes to document antidegradation reviews, particularly for Tier 2 waters, and to provide this documentation during opportunities for public review, such as the issuance of wastewater permits.
12. EPA recommends that Texas develop a provision to solicit input for the designation of water bodies as outstanding national resource waters. The states of Arkansas and New Mexico both have such a provision in state standards which may provide useful examples.

§307.6. Toxic Materials

13. §307.6(c)(1). Table 1 - Aquatic life criteria. EPA recommends the adoption of aquatic life criteria for acrolein and carbaryl, based on two new aquatic life criteria documents under CWA §304(a).

Aquatic life criteria recommendations for acrolein were published in 2009.⁴ The criteria document notes that acrolein is used for weed control in irrigation canals and in several industrial processes. A criterion of 3.0 ug/L is appropriate to protect for acute and chronic effects to freshwater species. Sufficient data to derive criteria for the protection of saltwater species were not available.

Aquatic life criteria recommendations were published for carbaryl in 2012.⁵ The criteria document reports that carbaryl is a commonly used pesticide in both commercial and home environments. The same value of 2.1 ug/L is recommended as both the acute criterion and the chronic criterion to protect freshwater species. The 2013 criteria document also includes a recommended acute criterion of 1.6 ug/L to protect aquatic life in marine waters, which is significantly lower than the current acute criterion of 613 ug/L in the Texas WQS.

14. §307.6(c)(1). Table 1 - Aquatic life criteria. Aquatic life criteria for several substances were recalculated from EPA’s §304(a) criteria recommendations, when these values were originally adopted in the 1988 WQS. Although EPA has not revised each of the original criteria documents, the Agency has published updated methods for recalculating aquatic life criteria. These procedures which

³ U.S.EPA. 2014. *Decision Tool for Downstream Water Quality Protection*. Available at: <http://cfpub.epa.gov/wqsits/downstream-protection-tool/>

⁴ U.S.EPA. 2009. *Ambient Aquatic Life Water Quality Criteria for Acrolein*, Office of Water. Washington, D.C. 49 pages. EPA-822-F-09-004. Available at: <http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/pollutants/acrolein/aq-final.cfm>

⁵ U.S.EPA. 2012. *Aquatic Life Ambient Water Quality Criteria for Carbaryl–2012*. Office of Water. Washington, D.C. EPA-820-R-12-007. 199 pages. Available at: http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/carbaryl_index.cfm

were used in the 2010 revision of the Texas WQS for several substances, where new or revised §304(a) criteria had been published by EPA.

However, the updated recalculation procedures have been not used for all existing criteria in the Texas standards. In addition to the procedures used in the 2010 revision, EPA published an updated guidance for recalculation of aquatic life criteria, as part of the implementation tools released at the same time as the 2013 ammonia document.⁶ EPA recommends that TCEQ re-evaluate the criteria for the following substances, to determine if the existing criteria are still appropriate or whether the statewide criteria should be revised, based on newer information for aquatic species found in Texas:

Arsenic – saltwater	Pentachlorophenol – saltwater
Copper – saltwater	Selenium – saltwater
Cyanide - freshwater and saltwater	Toxaphene – freshwater (acute only)
Nickel – saltwater	Zinc – saltwater

15. §307.6(c)(4). EPA recommends the adoption of chemical-specific criteria appropriate for addressing ammonia and chlorine toxicity to aquatic life. Direct measurement is more representative of potential impacts. Both of these chemicals degrade and break down in preparation for and during toxicity tests, thus direct measurements are a better indicator of potential risks to aquatic life. Although additional requirements for both dechlorination and ammonia limits in permits for specific minor dischargers were incorporated in the 2010 *Implementation Procedures*, WET requirements are not included in wastewater permits for many minor facilities.

EPA published a revised criteria document for ammonia in 2013.⁷ In updating the 1999 ammonia criteria recommendations, EPA conducted an extensive literature review that incorporates new toxicity data from 69 studies, including new data on freshwater mussels and gill-bearing snails, which are both sensitive to ammonia toxicity. In particular, freshwater mussels are more sensitive to ammonia than the organisms included in the dataset used in EPA's 1999 criteria document. The Texas Parks and Wildlife Department has identified 15 mussel species in Texas as threatened under state law. Historic ranges for these species include at least ten of the 23 river basins in the state. Therefore, EPA believes that adoption of the §304(a) numeric criteria for ammonia is appropriate. Additional tools for implementation of the updated criteria are also available on the EPA website, including guidance for flexibilities in the application of criteria in water bodies where sensitive mussel species are not present.

EPA's current freshwater criteria recommendations for chlorine are: 19 ug/L (acute) and 11 ug/L (chronic).⁸ The agency's recommendations for chlorine criteria to protect saltwater species are 13 ug/L (acute) and 7.5 ug/L (chronic).

⁶ U.S.EPA. 2013. *The revised deletion process for the site-specific recalculation procedure for aquatic life criteria*. Office of Water. Washington, D.C. EPA 822-R-13-001. 15 pages. Available at: <http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/ammonia/>

⁷ U.S. EPA. 2013. *Aquatic Life Ambient Water Quality Criteria for Ammonia – Freshwater 2013*. Office of Water. Washington, D.C. EPA 822-R-13-001. 255 pages. Available at: <http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/ammonia/>

⁸ U.S. EPA. 1985. *Ambient Water Quality Criteria for Chlorine*. Office of Water. Washington, D.C. EPA 440/5-84-030. 65 pages. Available at: http://water.epa.gov/scitech/swguidance/standards/upload/2001_10_12_criteria_ambientwqc_chlorine1984.pdf

16. §307.6(d)(3). In November 2000, EPA published updated procedures for calculating human health criteria in *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (2000). Some components of the revised human health methodology, such as the use of a $\frac{3}{4}$ power scaling factor to convert animal weight to human weight, have been incorporated for specific criteria during recent revisions of the Texas WQS.

In early 2014, EPA published draft updates for the CWA §304(a) human health criteria recommendations, based on the 2000 methodology and other information.⁹ The updated recommendations include: revised cancer slope factors (CSF) and reference doses (RfD); use of a relative source contribution (RSC) in criteria for non-carcinogens to account for other sources of exposure (e.g., food or air); use of bioaccumulation factors (BAFs) instead of bioconcentration factors (BCFs); and derivation of BAFs using aquatic trophic levels. The agency is completing review of comments received during the public participation period and plans to publish final recommendations in the near future. EPA recommends incorporation of the updated criteria in the next revision of the Texas WQS. Additional discussion on exposure factors is included below in comment 17. Where EPA incorporated an updated CSF or RfD in the 2014 draft criteria, for a substance which is included 2014 Texas WQS, the updated factors are noted below in comment 20.

17. §307.6(d)(3)(E)-(F). EPA's 2000 Human Health Methodology recommended use of the following exposure factors for adults, where site-specific information is not available: 90th percentile estimate for drinking water intake (2 L/day); mean body weight (70 kg); and, 90th percentile for consumption of freshwater and estuarine fish (17.5 g/day). These parameters are used for calculation of the criteria in the 2014 Texas WQS, as well as previous versions of the standards.

EPA's draft recommendations for human health criteria include updated exposure factors (for adults) of: body weight (80 kg), drinking water intake (3 L) and fish consumption (22 g/day). These factors are based on data from the National Health and Nutrition Examination Survey (NHANES). Detailed information on derivation of the updated factors is found in EPA's 2011 *Exposure Factors Handbook*.¹⁰ EPA recommends recalculation of the criteria for carcinogenic substances in Table 2, using the factors in the 2011 publication, and the updated §304(a) recommendations when published.

EPA supports the use of childhood exposure factors for Texas' human health criteria for noncarcinogens, which were incorporated during the 2010 triennial revision. These criteria are based on data for a six-year old child from a 1997 EPA document.¹¹ During the 2010 triennial revision, EPA published an updated guidance titled *Child-specific Exposure Factors Handbook*.¹² EPA's 2011 *Exposure Factors Handbook* supersedes the 2008 publication. Childhood exposure factors are included in the 2011 handbook and Chapter 1 includes a brief history on the earlier versions of these documents. If the criteria in Table 2 for non-carcinogens based on childhood exposure factors are

⁹ U.S. EPA. 2014. *DRAFT: Updated National Recommended Water Quality Criteria - Human Health*. Available at: <http://water.epa.gov/scitech/swguidance/standards/criteria/current/hhdraft.cfm>

¹⁰ U.S. EPA. 2011. *Exposure Factors Handbook: 2011 Edition*. National Center for Environmental Assessment, Washington, D.C. EPA/600/R-09/052F. 1436 pages. Available from the National Technical Information Service and online at: <http://www.epa.gov/ncea/efh>

¹¹ U.S. EPA. 1997. *Exposure factors handbook*. Office of Research and Development, National Center for Environmental Assessment. Washington, D.C. EPA/600/P-95/002F. 1216 pages. Available at: <http://cfpub.epa.gov/ncea/cfm/recorddisplay.cfm?deid=12464>

¹² U.S. EPA. 2008. *Child-specific-exposure factors handbook*. Office of Research and Development, National Center for Environmental Assessment. Washington, D.C. EPA/600/R-06/096F. 679 pages. Available at: <http://cfpub.epa.gov/ncea/cfm/recorddisplay.cfm?deid=20563>

retained, TCEQ EPA recommends recalculation of these criteria using the updated information in the 2011 *Exposure Factors Handbook*. EPA also published a document with case examples on using the 2011 handbook to assess childhood exposure.¹³

18. §307.6(d)(1). Table 2 - Human health criteria. EPA recommends the adoption of the §304(a) criterion of 0.3 mg/kg for methylmercury (measured in fish tissue).¹⁴ This value has undergone extensive peer review by the U.S. National Academy of Sciences, National Research Council. In 2010, EPA also published companion implementation guidance to address issues associated of the new water quality criterion and to facilitate implementation of the criterion in the total maximum daily load and permitting programs. The guidance document is available at the same website as the criterion document.
19. §307.6(d)(1). Table 2 - Human health criteria. EPA recommends that TCEQ consider the adoption of human health criteria for the following substances: 1,2,4-trichlorobenzene, 1,2-dichloroethylene (mixture of cis and trans), phenol and zinc. EPA has developed risk-based criteria under CWA §304(a) for these compounds, which were reported in the 2013 Toxics Release Inventory as discharged directly to surface waters in Texas. The enclosed spreadsheet includes total amount discharged, along with information from EPA's Integrated Risk Information System (IRIS) database.¹⁵ Criteria for trans-1,2 dichloroethylene are included in EPA's 2014 draft criteria recommendations. For phenol and zinc, EPA has also published criteria recommendations based on organoleptic effects, which are more stringent than the risk-based values. Criteria for organoleptic effects are also found on EPA's website for nationally recommended water quality criteria.¹⁶ The enclosed spreadsheet also identifies discharged substances for which a CSF or RfD is included in IRIS, but EPA has not published recommended criteria. The level of confidence in the CSF or RfD value for each substance is provided in the spreadsheet.
20. In addition to the updated exposure factors noted in comment 17, EPA's 2014 draft updates also incorporate updated RfDs for non-carcinogenic substances and CSFs for carcinogenic substances. In most cases, these values are found in EPA's Integrated Risk Information System (IRIS) database. However, EPA also relied on other sources for updated information. Each of the draft criteria documents includes a brief summary of the basis for the RfD or the CSF and is available from the website noted in footnote 9. For the next triennial revision, EPA recommends recalculating human health criteria for the following substances, with the updated RfD or CSF:
 - Benzo(a)anthracene (92-87-5): A revised CSF of 0.29 mg/kg-day is used in the updated §304(a) recommendations. This value is based on a peer-reviewed toxicology assessment of benzo(a)pyrene and potency equivalency factor of 0.1. (TCEQ also used the same equivalency factor in the 2014 criteria). The updated CSF includes the scaling factor of ¾ for converting animal weight to human weight. The IRIS database has not been updated with this information yet, but more information is available in the draft criteria document.¹⁷

¹³ U.S. EPA. 2014. *Child-Specific Exposure Scenarios Examples*. National Center for Environmental Assessment. Washington, D.C.; EPA/600/R-14/217F. 116 pages. Available from the National Technical Information Service and online at: <http://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=262211>

¹⁴ U.S. EPA. 2001. *Water quality criterion for the protection of human health: Methylmercury*. Office of Water. Washington, D.C. EPA-823-R-01-001. 303 pages. Available at: <http://water.epa.gov/scitech/swguidance/standards/criteria/health/methylmercury.cfm>

¹⁵ U.S. EPA. *Integrated Risk Information System (IRIS)*. Available at: <http://www.epa.gov/iris/index.html>

¹⁶ U.S. EPA. *National Recommended Water Quality Criteria*. Available at: <http://water.epa.gov/scitech/swguidance/standards/current/index.cfm>

¹⁷ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Benzo(a)Anthracene 56-55-3*.

- Benzo(a)pyrene (50-32-8): As noted above, a recent assessment of benzo(a)pyrene has been used in EPA's draft updates for recommended human health criteria. The draft criteria document for benzo(a)pyrene includes a CSF of 2.9 mg/kg·day.^{18, 19}
- Bromodichloromethane (75-27-4): EPA's draft human health criteria include a CSF of 0.035 mg/kg·day based on a 2005 risk assessment completed under the drinking water program. This value includes the scaling factor of ¾ for converting animal weight to human weight.^{20, 21}
- Bromoform (75-25-2): EPA's draft human health criteria include a CSF of 0.0046 mg/kg·day based on the 2005 risk assessment cited for bromodichloromethane.²² This value includes the scaling factor of ¾ for converting animal weight to human weight.
- Chlorodibromomethane (124-48-1): EPA's draft human health criteria include a CSF of 0.043 mg/kg·day based on the 2005 risk assessment cited for bromodichloromethane.²³ This value includes the scaling factor of ¾ for converting animal weight to human weight.
- Chrysene (218-01-9): Based on the 2010 toxicological assessment for benzo(a)pyrene and a potency equivalency factor of 0.01, EPA's draft human health criteria for chrysene include a CSF of 0.029 mg/kg·day.²⁴
- Cyanide (57-12-5): The IRIS assessment summary for free cyanide is included under the information for hydrogen cyanide and cyanide salts (updated September 201).¹⁵ The RfD for free cyanide is 0.0006 mg/kg/day (rounded from 0.00063 mg/kg/day, which is also used in EPA's draft criteria document.²⁵ The 2014 Texas WQS include a human health criterion based on the maximum contaminant level (MCL) of 200 ug/L (retained from earlier revisions), as the risk-based criteria calculated with the previously-recommended RfD were considerably less stringent than the MCL. Using the updated RfD and the childhood exposure factors from the existing WQS (please see comment 17), results in criteria of 14 ug/L (water and fish consumption) and 1,607 ug/L (fish consumption). EPA recommends that TCEQ consider the adoption of risk-based criteria for cyanide.

Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-011.

¹⁸ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Benzo(a)Pyrene 50-32-8*.

Office of Water. Washington, D.C. EPA 820-D-14-012. 15 pages. Available at:

¹⁹ Office of Environmental Health Hazard Assessment. 2010. *Public Health Goals for Chemicals in Drinking Water-Benzo(a)pyrene*. California Environmental Protection Agency. Sacramento. 68 pages. Available at: <http://www.oehha.ca.gov/water/phg/pdf/091610Benzopyrene.pdf>.

²⁰ U.S. EPA. 2005. Drinking Water Criteria Document for Brominated Trihalomethanes. Office of Water. Washington, DC. EPA-822-R-05-011. 444 pages. Available at:

http://water.epa.gov/action/advisories/drinking/upload/2006_05_04_criteria_drinking_brthm-200605-508.pdf

²¹ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Dichlorobromomethane 75-27-4*. Office of Water. Washington, D.C. 14 pages. EPA 820-D-14-032.

²² U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Bromoform 75-25-2*. Office of Water. Washington, D.C. 14 pages. EPA 820-D-14-021.

²³ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Chlorodibromomethane 124-48-1*. Office of Water. Washington, D.C. 14 pages. EPA 820-D-14-026.

²⁴ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Chrysene 218-01-9*. Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-029.

²⁵ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Cyanide 57-12-5*. Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-030.

- 2,4-D (94-75-7): The 2014 draft criteria document includes a RfD of 0.05 mg/kg·day, which was published in a 2012 document from the Office of Chemical Safety and Pollution Prevention.^{26,27}
- m-Dichlorobenzene (541-73-1): In the 2014 draft criteria document, EPA used a RfD of 0.002 mg/kg·day.²⁸
- o-Dichlorobenzene (95-50-1): In the 2014 draft criteria document, EPA used a RfD of 0.3 mg/kg·day.²⁹
- p-Dichlorobenzene (95-50-1): In the 2014 draft criteria document, EPA used a RfD of 0.07 mg/kg·day.³⁰
- Dichloromethane (75-09-2): The CSF in IRIS was updated in 2011 to 0.002 mg/kg·day, which is incorporated in the 2014 Texas WQS. In the 2014 draft criteria updates, EPA modified the CSF by applying an age-dependent adjustment factors (ADAF) due to possible mutagenic effects. The revised CSF is 0.0033 mg/kg·day.³¹
- 1,2-Dichloropropane (78-87-5): In the 2014 draft criteria, EPA used a toxicology assessment from the California Environmental Protection Agency to update the CSF to 0.036 mg/kg·day.^{32,33} This value includes the scaling factor of ¾ for converting animal weight to human weight.
- Hexachlorobutadiene (87-68-3): EPA's draft human health criteria include a CSF of 0.04 mg/kg·day based on a 2003 risk assessment. This value includes the scaling factor of ¾ for converting animal weight to human weight.^{34, 35}

²⁶ U.S. EPA. 2014. Draft Update of Human Health Ambient Water Quality Criteria: *Chlorophenoxy Herbicide (2,4-D) 94-75-7*. Office of Water. Washington, D.C. 16 pages. EPA 820-D-14-028.

²⁷ U.S. EPA. 2012. *2,4-D. Human Health Assessment Scoping Document in Support of Registration Review*. Office of Chemical Safety and Pollution Prevention. Washington, D.C. 36 pages. Available at: <http://www.regulations.gov> [Under docket "EPA-HQ-OPP-2012-0330," search in "Supporting Documentation"]

²⁸ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: 1,3-Dichlorobenzene 541-73-1*. Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-078.

²⁹ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: 1,2-Dichlorobenzene 95-50-1*. Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-073.

³⁰ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: 1,4-Dichlorobenzene 106-46-7*. Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-080.

³¹ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Methylene Chloride 75-09-2*. Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-056.

³² U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: 1,2-Dichloropropane 78-87-5*. Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-075.

³³ California Environmental Protection Agency. 1999. *Public Health Goal for 1,2-Dichloropropane in Drinking Water*. Office of Environmental Health Hazard Assessment. 31 pages. Available at: http://www.oehha.ca.gov/water/phg/pdf/12dcp_f.pdf.

³⁴ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: Hexachlorobutadiene 87-68-3*. Office of Water. Washington, D.C. 15 pages. EPA 820-D-14-048.

³⁵ U.S. EPA. *Health Effects Support Document for Hexachlorobutadiene*. Office of Water. Washington, DC. EPA-822-R-03-002. 135 pages. Available at: <http://www2.epa.gov/ccl/regulatory-determination-1-support-documents-hexachlorobutadiene>

- Hexachlorocyclohexane (*gamma*)(Lindane) (58-89-9): EPA’s draft human health criteria include a RfD of 0.0047 mg/kg·day, based on an evaluation under the pesticide program.^{36, 37}

21. §307.6(e)(1). Total toxicity. EPA recommends adding language to this provision which states that chronic toxicity will also be precluded in waters with seasonal aquatic life uses.

§307.7. Site-specific Uses and Criteria

22. §307.7(a). This section makes reference to the applicability of site-specific criteria to “substances attributed to waste discharges or human activities” and the exemption where “surface waters exceed criteria due to natural phenomena.” Sections 307.4 (General Criteria) and 307.6. (Toxic Materials) of the Texas WQS include similar language in the first paragraph of each section. Although the Implementation Procedures include language mentioning that designated uses can be modified through the use attainability to account for naturally-occurring pollutants and that site-specific aquatic life criteria may be modified to take into account natural conditions, there is no specific procedure for demonstrating the difference between “natural phenomena” and human influence.

EPA recently published an interim “Natural Conditions Framework” to address the need for clarity and direction in establishing site-specific water quality criteria for dissolved oxygen, temperature or pH, based on natural background conditions.³⁸ A final version of this publication may be available in early 2016, following completion of a peer review process by external parties. The interim framework consists of the following five general steps:

- (1) Determine the need for a natural background criterion;
- (2) Determine whether non-attainment of the water quality criterion is due to natural processes;
- (3) Determine the spatial and temporal boundaries of the natural condition;
- (4) Calculate a site-specific natural background criterion; and,
- (5) Adopt site-specific natural background criterion.

EPA recommends that TCEQ review the interim framework and consider expanding these provisions in the WQS or in the Implementation Procedures. In the absence of a procedure for determining natural background, or, the establishment of site-specific uses and criteria based on natural background levels, the criteria found in §307.4, §307.6, and §307.7 would, in EPA’s view, stand as the applicable criteria.

³⁶ U.S. EPA. 2014. *Draft Update of Human Health Ambient Water Quality Criteria: gamma-BHC (Lindane)* 58-89-9. Office of Water. Washington, D.C. 18 pages. EPA 820-D-14-044.

³⁷ U.S. EPA. 2001. *Memorandum: Lindane (009001) Reregistration Case No. 0315. Revised Anticipated Residues, Acute and Chronic Dietary Exposure and Risk Analyses for the HED Human Health Risk Assessment. DP Barcode D279260.* Office of Chemical Safety and Pollution Prevention. Washington, D.C. 32 pages. Available at: <http://www.regulations.gov> [Under docket “EPA-HQ-OPP-2002-0202-0027,” search in “Supporting Documentation”]

³⁸ U.S. EPA. 2015. *A Framework for Defining and Documenting Natural Conditions for Development of Site-Specific Natural Background Aquatic Life Criteria for Temperature, Dissolved Oxygen, and pH: Interim Document.* Office of Water. Washington, D.C. 28 pages. Available at: http://water.epa.gov/scitech/swguidance/standards/library/upload/natural_conditions_framework.pdf

23. §307.7(b)(1). Recreation. EPA recommends revising the recreational criteria for the primary contact uses in freshwater and saltwater to be consistent with EPA's 2012 criteria recommendations.³⁹ Section 303(i)(1)(B) of the CWA (as amended by the BEACH Act of 2000) directs each state with coastal recreational waters to adopt and submit to EPA new or revised water quality standards for those waters for all pathogens and pathogen indicators to which the new or revised water quality criteria are applicable. EPA's 2012 recommendations apply to all waters designated for primary contact recreation.

The updated recreational water quality criteria were developed based on a review of historic studies and more recent scientific information including the National Epidemiological and Environmental Assessment of Recreational (NEEAR) water studies at U.S. beaches in 2003, 2004, 2005, 2007, and 2009. Those studies enrolled 54,250 participants, encompassed nine locations, and collected and analyzed numerous samples from a combination of fresh, marine, tropical, and temperate waters. The resulting criteria have numerous improvements over the 1986 criteria:

- The criteria consist of both a geometric mean and statistical threshold value (STV).
- The criteria now comprise a magnitude, duration, and frequency.
- States may choose from two different sets of recommended criteria values to protect primary contact recreation waters.
- The criteria recommendations for fresh and marine waters are based on the same illness rate.
- The criteria no longer refer to different use intensities.

States may also take advantage of newly-developed rapid test (qPCR) methods in adopting WQS on a site-specific basis. Beach Action Values for use in beach notification programs are also provided in the criteria document.

The magnitude of the geometric mean criteria of 126 per 100 mL (*E. coli* in freshwater) and 35 per 100 mL (enterococci in saltwater) is consistent with EPA's 2012 criteria document. The frequency of exceedance of the geometric mean (not to be exceeded) is also consistent with EPA's current recommendations. However, Texas generally uses seven years of data for assessment of recreation uses under CWA §303(d), which is significantly longer than the recommended 30-day duration included in the 2012 criteria document. EPA criteria experts have indicated that a duration of up to 90 days may be acceptable, if additional justification is provided. However, the research conducted for development of the 2012 recommended criteria did not support a duration longer than 90 days. In addition, EPA recommends use of the STV criterion for assessment of recreation uses under CWA §303(d). A number of states have raised concerns about assessing recreation uses based on small data sets, since monitoring in most waters bodies is infrequent. In response, the program offices at EPA Headquarters initiated a project in 2014 to evaluate statistical methods for combining assessment periods, which could increase the number of samples contributing to a geometric mean calculation, but still be appropriately representative of a 30-day duration. A draft product from this project may be available in summer 2015.

³⁹ U.S. EPA. 2012. *Recreational Water Quality Criteria*. Office of Water. Washington, D.C. EPA 820-F-12-058. 69 pages. Available at: <http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/index.cfm>

24. §307.7(b)(5). EPA recommends that Appendix A of the standards identify which segments are designated for the seagrass propagation use. The current and historical distributions of seagrasses in Texas are fairly well known, so this would be a feasible task. We also encourage TCEQ to consider applying the seagrass propagation use not only to locations where seagrasses currently exist, but also where they existed historically, and where their restoration is thought to be achievable.

We also recommend developing narrative or numeric criteria to protect the seagrass propagation use, along with implementation procedures for any criteria. There is a good basic understanding of the light requirements of seagrasses and criteria for light could be established in the near future. We believe sufficient information of the relative importance of suspended solids, chlorophyll a, and other light absorbing and light scattering substances, in controlling the light regime in seagrass beds is available. In addition, criteria are needed to protect seagrasses from excessive epiphytic algal growth, and from the effects of excessive macro-algal growth in general in seagrass beds. This may require nutrient criteria. Investigation over the next few years to set appropriate criteria to protect seagrasses from nutrient stressors is recommended. In recent years, data has been collected by the University of Texas Marine Science Institute as part of a Regional Environmental Assessment Program funded by EPA. Also, the coastal seagrass monitoring program coordinated by the Texas Parks and Wildlife Department may yield valuable data. For example, aerial photography of seagrass could serve as a basis for establishing aerial expectations for seagrass coverage for specific bay systems and in development of numeric criteria. Finally, development of biocriteria for seagrasses is a future need and the above studies would also be an important data resource.

§307.8. Application of Standards

25. §307.8(b) Mixing zones. EPA recommends including size limitations for mixing zones in the standards and the development of procedures to prevent the overlap of mixing zones in segments with multiple dischargers (as referenced in §307.8(b)(7)). EPA also recommends incorporating size limitations for industrial cooling water areas, into the WQS and/or the Implementation Procedures, as these procedures are developed through the stakeholder workgroups.

§307.9. Determination of Standards Attainment

26. §307.9(c)(2). Collection and preservation of water samples. Earlier versions of the Texas WQS included separate provisions under §307.9(c) for bays and tidal streams, which EPA believes is appropriate to describe standards attainment procedures in these two different types of ecosystems. A review published in 2008 examined historical records of fish kills in Texas' coastal waters.⁴⁰ The authors found that low dissolved oxygen levels were the predominant cause of fish kills in coastal waters and also noted that thermal stratification often occurs even in shallow bays and estuaries. EPA recommends that TCEQ evaluate options for establishing protective dissolved oxygen criteria in coastal water bodies, where stratification occurs.

Appendix A - Site-specific Uses and Criteria for Classified Segments

27. Segment 1006 - Houston Ship Channel and segment 1007 - Houston Ship Channel/Buffalo Bayou Tidal. As stated during previous triennial revisions, EPA strongly recommends that aquatic life uses be adopted for segments 1006 and 1007 of the Houston Ship Channel. Data has been collected to demonstrate that an aquatic life use is justified. In accordance with this recommendation the dissolved

⁴⁰ Thronson, A. and A. Quigg, 2008. Fifty five years of fish kills in Coastal Texas. *Estuaries and Coasts*. 31:802-813.

oxygen standards should be evaluated. Increasing the dissolved oxygen standards from 1.0 mg/L to 2.0 mg/L for 1007 and from 2.0 mg/L to 3.0 mg/L for segment 1006 are recommended to protect the actual aquatic life use. The adoption of aquatic life uses and revised standards would allow a transition to a dissolved standard of 4.0 mg/L and high quality aquatic life use for segment 1005 – Houston Ship Channel/San Jacinto River Tidal. The present difference between the standard of 2.0 mg/L in segment 1006 to 4.0 mg/L in segment 1005 may result in impairment around the segment boundary (in the vicinity of the monument).

28. Segment 1431 – Mid-Pecan Bayou: We believe that an aquatic life UAA has been completed for this reach of Pecan Bayou. If the study is still ongoing at the time next WQS revision, EPA recommends that a presumed high quality aquatic life use and corresponding dissolved oxygen criteria be proposed for segment 1431.

Appendix D - Site-specific Uses and Criteria for Unclassified Water Bodies

29. Pine Creek (segment 0202). A previously-approved Use Attainability Analysis (UAA) was used to establish an intermediate aquatic life use for Pine Creek in the 2000 WQS. However, sampling for the UAA was conducted in the upper end of this water body and several tributaries enter Pine Creek in the reach downstream of the sampling point (approximately 30 km). EPA recommends evaluation of the downstream portion of Pine Creek to determine if it can support a high aquatic life use.
30. Spring Branch (segment 0801). We believe that recommendations from an older UAA has been inadvertently omitted from Appendix D. A UAA was completed in 1999 for Spring Branch located in Chambers County, which is a different water body than the existing entry for Spring Branch in Appendix D (also within segment 0801, but in Liberty County). The 1999 UAA recommended an intermediate aquatic life use for Spring Branch from the confluence with Lee Gully upstream to approximately 3.09 km north of the confluence with Albritton Gully. TCEQ may wish to add this water body in the next triennial revision.